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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/711,143	08/27/2004	Anne E. Watson	BUR920040120US1	5142
46170	7590	06/30/2006	EXAMINER	
WHITHAM, CURTIS & CHRISTOFFERSON, P.C.			KIK, PHALLAKA	
11491 SUNSET HILLS ROAD, SUITE 340			ART UNIT	
RESTON, VA 20190			PAPER NUMBER	
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DATE MAILED: 06/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

A

Office Action Summary	Application No. 10/711,143	Applicant(s) WATSON ET AL.	
	Examiner Phallaka Kik	Art Unit 2825	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 8/27/04, 10/8/04, 6/9/06.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 21-23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 August 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. <u>20060624</u> . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>8/27/04 & 10/8/04</u> . | 6) <input type="checkbox"/> Other: _____. |

DETAILED ACTION

1. This Office Action responds to the Application filed on 8/27/2004, IDS filed on 8/27/2004 and 10/8/2004 and interview conducted on 6/9/2006. Claims 1-23 are pending, wherein claims 21-23 are withdrawn from consideration as being directed to non-elected invention without traverse.

Election/Restrictions

2. Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-20, drawn to a method for evaluating minority carrier transmission in a semiconductor chip design, classified in class 716, subclass 4.
- II. Claims 21-23, drawn to computer aided design structure/apparatus for evaluating latchup and noise, classified in class 716, subclass 4.

3. The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case, the method of claims 1-20 can be practice using apparatus other than that of invention II, claims 21-23 .

4. Because these inventions are independent or distinct for the reasons given above and the inventions require a different field of search (see MPEP § 808.02), restriction for examination purposes as indicated is proper.

5. During a telephone conversation with Michael E. Whitham (Reg. No. 32,635) on 6/9/2006 a provisional election was made without traverse to prosecute the invention of group I, claims 1-20. Affirmation of this election must be made by applicant in replying to this Office action. Claims 21-23 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Drawings

7. The drawings are objected to because the lines, numbers and/or letters are not uniformly thick and well defined, clean, durable and black in Figs. 5c, 6a (see 37 CFR 1.84(l)). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering

of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

8. **Claims 1-20** are objected to because of the following informalities:

As per **claim 1**, --using said quantified characteristics-- should be inserted after "domains" (last line) to provide for the missing, essential functional/structural relationships among the elements of the claim (see paragraph [Para 44] of Applicant's specification).

As per **claims 5-9,16,20**, "the step" (line 1) should be --a step-- for proper antecedent basis. Also, as per **claims 5,9**, "the substrate" (line 2) should be --a substrate-- for proper antecedent basis.

As per **claim 12**, --using said quantified characteristics-- should be inserted after "unit cell" (line 19) to provide for the missing, essential functional/structural relationships among the elements of the claim (see paragraph [Para 44] of Applicant's specification).

As per **claims 14,15**, "claim 11" (line 1) should be --claim 13-- to provide for proper antecedent basis for "said two normal planes" (lines 1-2).

As per **claim 19**, "claim 10" (line 1) should be --claim 12-- to provide for proper antecedent basis for "said array of unit cells" (line 1).

As per **claims 2-11,13-20**, the claims are also objected to for incorporating the above errors into the respective claims by claim dependency.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

9. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

10. **Claims 1-20** are rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility, wherein the claims are directed to manipulation of abstract ideas, lacking practical application (i.e., no practical application is recited in the claims such as determining latchup or noise or defect or re-designing the circuit based on the total minor carrier transmission evaluated) (see Schrader, 22 F. 3d at 293-94, 30 USPQ2d at 1458-59; Warmerdam, 33 F.3d at 1360, 31 USPQ2d at 1759).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. **Claims 1,7-8,10-12,18-19** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Nagase et al.** (US Patent No. 5,812,434) in view of **Finman** (US Patent No. 5,117,377).

As per **claims 1,7,12, Nagase et al.** disclose the shapes of the semiconductor chip design corresponds to the layout of the circuit device, domains correspond to the partitioned areas, which contain points and are connected by current path (i.e., arc), from which the total minority carrier transmission is calculated (i.e., current, wherein since minority carrier transmission refers to electrons flow, current would also fit this definition) (see abstract; col. 2, line 50 to col. 3, line 56), wherein since the circuit device is usually made up of a plurality of circuit blocks, which further include several basic building blocks or unit cells, including various cells such as parameterized cells or memory arrays, the array of such unit cells would be included as being within the scope of the invention, and the total current calculated would necessarily reflect the contribution of these array of unit cells. However, **Nagase et al.** failed to teach that the quantification of the absorption, reflection and transmission characteristics of each of the domains along the arc or current path. **Finman** teaches the affects of absorption, reflection and transmission characteristics of the electromagnetic strength has on the induced current path (see col. 7, line 15 to col. 8, line 31). It would have been obvious to one of ordinary skilled in the art at the time of the invention to further quantify or calculate the affects of absorption< reflection and transmission characteristics as taught by **Finman** for each of the domains of the method/system of **Nagase et al.** because such quantification or calculation would insure that the calculated current (i.e., minority

carrier transmission) is more accurate for each of the domains by taking into account the effects of these characteristics.

As per **claim 8, Nagase et** in view of **Finman** discloses all of the elements of claim 1, from which the claims depends, as discussed above, wherein **Nagase et al.** also describe the first and second points being located on a boundary of a circuit (see col. 12, lines 59-65).

As per **claim 10-11, Nagase et** in view of **Finman** discloses all of the elements of claim 1, from which the claims depends, as discussed above, wherein **Nagase et al.** further disclose the current or minority carrier calculation using matrix as part of the moment equations (see col. 2, lines 19-30).

13. **Claims 9,20** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Nagase et al.** (US Patent No. 5,812,434) in view of **Finman** (US Patent No. 5,117,377) and **G. Krieger** ("Bipolar Transistor Action and Transport Effects Relating to CMOS Latchup", IEEE Transactions on Electron Devices, Vol. ED-34, No. 8, August 1987, pp. 1719-1728).

As per **claims 9,20, Nagase et al.** in view of **Finman** disclose all of the elements of claims 1,10 as discussed above, but failed to teach the step of relating to a pnpn structure. **G. Krieger** teach the latchup of pnpn structures (i.e., pn transistors devices laid next to other pn devices forming pnpn transistors) requiring the analysis of minority carrier transmission (see abstract; section II). It would have been obvious to one of ordinary skilled in the art at the time of the invention to further incorporate apply the methods/systems of **Nagase et al.** in view of **Finman** to various circuits such as pnpn

transistors structures as taught by **G. Krieger** because such application would further allow the correct design and analysis of the these devices to avoid latchup problems while at the same benefiting from the accuracy and speed of the method/system of **Nagase et al.** in view of **Finman**.

Allowable Subject Matter

14. **Claims 2-6,13-17** would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 101, the minor informalities set forth in this Office action and claims 2,5-6,13,16-17 are rewritten to include all of the limitations of the base claim and any intervening claims, wherein claims 14-15 are also rewritten to depend on claim 13 as suggested in the objection set forth above.

15. The following is a statement of reasons for the indication of allowable subject matter:

As per **claims 2-4,13-15**, the claims recite the inventive features of having the domains or areas being delimited by (i.e., established by the boundary) of two normal planes as domains being defined from which the total minority carrier transmission is calculated, as claimed, which the prior arts made of record failed to teach or suggest. Accordingly, the claimed invention is novel and un-obvious over the prior arts made of record.

As per **claims 5-6,16-17**, the claims recite the inventive steps of removing the shapes that are not in the substrate or within a well tub of the second doping polarity, prior to the step of defining the arc as claimed.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Therefore, Applicant is requested herein to consider them carefully in response to this Office Action. In particular, the following prior arts made of record are most relevant:

Roach (U.S. Patent Application Publication No. 2005/0261846) teach the effects of absorption of reflected energy in transmission line on the amount of current measured (see paragraph [0014]).

Akiyama (US Patent No. 5,774,696, especially col. 1, line 62 to col. 2, line 30, col. 2, line 59 to col. 3, line 9, col. 6, line 64 to col. 7, line 41), **Ditlow et al.** (US Patent No. 6,601,025, especially col. 4, line 19 to col. 5, line 67), **Kumashiro** (US Patent No. 5,677,846, especially col. 1, lines 39-55, col. 8, lines 28-48), and **Meuris et al.** (US Patent Application Publication No. 2002/0042698, especially paragraphs [0015], [0213], [0225], [0011]-[0012], [0051]-[0052]) teach various methods/systems of analyzing current using mesh or partitioned areas analysis.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Therefore, Applicant is herein requested to consider them carefully in response to this Office Action.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phallaka Kik whose telephone number is 571-272-1895. The examiner can normally be reached on Monday-Thursday, 8:30AM-7PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Chiang can be reached on 571-272-7483. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Any response to this action should be mailed to:

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

or faxed to:

571-273-8300



Phallaka Kik
Primary Examiner
Art Unit 2825
June 24, 2006